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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/930,172 | 08/16/2001 | Hiromasa Tanaka | 57454-168 | 1155 |

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Washington, DC 20005-3096

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| EXAMINER |
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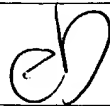
WILKINS III, HARRY D

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| ART UNIT | PAPER NUMBER |
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1742

DATE MAILED: 03/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|----------------------------------|------------------------------------------------------------------------------------------------------------------|--|
| Office Action Summary | Application No. 09/930,172 | Applicant(s) TANAKA ET AL.  | |
| | Examiner Harry D Wilkins, III | Art Unit 1742 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 7 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 4 and 7 is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

1. The rejections under 35 USC 103 based upon Maeda in view of Ochi et al have been withdrawn in view of Applicant's amendment of the range of Si.
2. The rejections under 35 USC 103 based upon Maeda et al in view of Ochi et al and Mitamura have been withdrawn in view of Applicant's amendment of the range of Si.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ochi et al (EP 0933440) in view of Mitamura (GB 2,235,698).

Ochi et al teach (see abstract) a case hardening steel that has a composition which overlaps the presently claimed composition ranges.

| | | | |
|--|---------|------------|---------|
| | Claimed | Ochi et al | Overlap |
|--|---------|------------|---------|

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| | | | |
|----|--------------|----------------|-------------------|
| C | 0.1-0.4 wt% | 0.1-0.4 wt% | At 0.1-0.4 wt% |
| Si | 0.53-3.0 wt% | 0.02-1.3 wt% | At 0.53-1.3 wt% |
| Mn | 0.2-2.0 wt% | 0.3-1.8 wt% | At 0.3-1.8 wt% |
| P | <0.03 wt% | <0.025 wt% | At <0.025 wt% |
| S | <0.03 wt% | 0.001-0.15 wt% | At 0.001-0.03 wt% |
| Cr | 0.3-2.5 wt% | 0.4-1.8 wt% | At 0.4-1.8 wt% |
| Ni | 0.1-2.0 wt% | 0.1-3.5 wt% | At 0.1-2.0 wt% |
| Al | <0.05 wt% | 0.015-0.04 wt% | At 0.015-0.04 wt% |
| Ti | <0.003 wt% | <0.01 wt%* | At <0.0025 wt%* |
| O | <0.0015 wt% | <0.0025 wt%** | At <0.0012 wt%** |
| N | <0.025 wt% | 0.006-0.02 wt% | At 0.006-0.02 wt% |
| Mo | 0.05-2.5 wt% | 0.02-1.0 wt% | At 0.05-1.0 wt% |
| V | 0.05-1.0 wt% | 0.03-0.5 wt% | At 0.05-0.5 wt% |

*Ochi et al provide (see paragraph 30) a desired range of <0.0025 wt% Ti.

**Ochi et al provide (see paragraph 31) a desired range of <0.0012 wt% O.

Ochi et al teach (see paragraph 61) that the method of production includes carburizing followed by quenching (water cooling).

The differences between the invention of Ochi et al and the present invention are that (1) Ochi et al do not teach a tempering step that occurs at temperatures of 250-350°C (thereby providing a hardness of at least HRC 57) and (2) Ochi et al do not teach that the steel is made into a rolling bearing component having an inner ring, outer ring and a rolling element.

Mitamura teaches (see last 2 paragraphs on page 6 and 1st paragraph on page 7) a rolling bearing constituted of a bearing ring and a rolling element made from a steel with a composition similar to the steel of Maeda et al and that *at least one of the races and rolling element is made from the steel*. Thus, Mitamura teaches making a rolling bearing where the inner race, outer race and rolling elements are made from the same composition. Mitamura teaches (see paragraph spanning pages 19 and 20) that the steel is subjected to a high temperature tempering (at 240-550°C) in order to impart

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dimensional stability at high temperatures to the steel by reducing the amount of retained austenite to below 3 vol%.

Therefore, it would have been obvious to one of ordinary skill in the art to have applied the high temperature tempering step of Mitamura to the steel of Ochi et al because the tempering step improves the dimensional stability of a rolling bearing at higher operating temperatures and it would have been obvious to make a rolling bearing from the case hardening steel of Ochi et al because it has properties, such as high surface hardness after carburizing, that make it ideal for use as a rolling bearing. Because the high temperature tempering process of Mitamura provides it benefits by reducing the amount of retained austenite to below 3 vol%, one of ordinary skill in the art would have had a reasonable expectation of successfully applying the high temperature tempering to the steel of Ochi et al because the slightly different compositions would not affect the result of the austenite being transformed to martensite.

Regarding the claimed surface hardness, one of ordinary skill in the art would have expected the steel of Ochi et al in view of Mitaura to have the hardness as claimed because it has an identical composition and is treated by an identical method (to the method disclosed in the specification).

Regarding the limitation that before the tempering the steel is subjected to intermediate annealing followed by secondary quenching, this claim is a product-by-process claim and any art that discloses the same product anticipates (obviates) the claim, even if made by a materially different process.

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"Even though product - by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product - by - process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe , 227 USPQ 964, 966 (Fed. Cir. 1985)

Based upon the disclosure of Ochi et al in view of Mitamura, the rolling bearing would have the surface hardness of at least HRC57 as claimed.

Regarding claim 2, see table above regarding the presence of Mo and V.

Regarding claim 3, the range of Mn+Ni taught by Ochi et al is 0.4-5.3 wt%. Thus, Ochi et al teach an overlapping range for Mn+Ni at 1.5-4.0 wt%. It would have been within the expected skill of a routineer in the art to have optimized the amount of Mn and Ni in the alloy of in order to maximize the strength and hardenability (see Ochi et al at paragraphs 19 and 27).

Allowable Subject Matter

6. Claims 4 and 7 are allowed.

7. The following is an examiner's statement of reasons for allowance: the prior art does not sufficiently teach or suggest the combination of carburizing/carbonitriding followed by intermediate annealing which in turn is followed by a secondary quenching. As discussed by Applicant on page 10 of the response filed 17 February 2004, the disclosure of Maruta et al does not contain an "intermediate annealing" step as defined by the present invention.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

8. Applicant's arguments filed 17 February 2004 have been fully considered but they are not persuasive. Applicant argued that:

a. The materials of Ochi and Mitamura are significantly different.

In response, the Examiner does not find this argument convincing. In fact, it appears that for the major elements in the steel compositions (C, Si, Mn, Cr), the ranges of Ochi and Mitamura overlap. The only difference is the presence of Ni in the steel of Ochi. However, the amount of Ni would not be sufficient to drastically change the properties of the steel such that the high temperature tempering of Mitamura would not be applicable.

b. Mitamura does not teach that each of the inner ring, outer ring and rolling element are made from the steel in the rolling bearing.

In response, by teaching "at least one of", Mitamura in fact discloses three options. One, is that only one of the parts is made using the steel. Two, that two parts of the bearing are made using the steel. And three, that all three parts of the bearing are made using the steel. Thus, while not expressly stated by Mitamura, the scope disclosed by Mitamura includes making all three parts (inner ring, outer ring and rolling elements) from the same steel composition.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-Th 10:00am-8:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Harry D Wilkins, III
Examiner
Art Unit 1742

hdw

ROY KING 
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700